

Two new species of triphorids (Gastropoda, Triphoridae) from the Miskitos Archipelago, Nicaragua

Dos nuevas especies de trifóridos (Gastropoda, Triphoridae) del Archipiélago de los Miskitos, Nicaragua

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ABSTRACT

Two new species of triphorids are described from the Miskitos Archipelago, Nicaragua; their paucispiral protoconchs indicate a non-planktotrophic development and probably both species are endemic from this area. The new species are compared with other Caribbean species of this family.

RESUMEN

Se describen dos nuevas especies de trifóridos del Archipiélago de los Miskitos, Nicaragua; sus protoconchas paucispirales indican un desarrollo no planctotrófico y, probablemente, que se trata de especies endémicas de esta zona. Las nuevas especies se comparan con otras de esta familia en el Caribe.

Key words: Gastropoda, Triphoridae, Miskitos Archipelago, Nicaragua.

Palabras clave: Gastropoda, Triphoridae, Archipiélago de los Miskitos, Nicaragua.

INTRODUCTION

The Miskitos Archipelago is located in the northern Atlantic coast of Nicaragua, i. e., the southern part of the Caribbean. The molluscs from this area have been the object of scant research work, namely those of FLUCK (1905a, b, c, d, e, 1906) and PETUCH (1998). Scattered data based upon the Fluck Collection, now in the Museum of Comparative Zoology (Harvard University), can be found in some general papers on Caribbean molluscs (CLENCH AND ABBOTT, 1941; BEQUAERT, 1942).

The information about Caribbean triphorids is dispersed in publications on

molluscs from different areas: Jamaica (ADAMS, 1845, 1850a, 1850b, most species illustrated in CLENCH AND TURNER, 1950), Gulf of Mexico and Caribbean (DALL, 1881, 1889, 1927), Virgin Islands (NOWELL-USTICKE, 1959, 1971), Yucatan Peninsula, Mexico (VOKES AND VOKES, 1983), Puerto Rico and other Caribbean areas (WARMKE AND ABBOTT, 1961), Curaçao, Aruba and Bonaire (DE JONG AND COOMANS, 1988), oceanic islands off Brazil (LEAL, 1991), Colombian Caribbean (DÍAZ MERLANO AND PUYANA HEGEDUS, 1994). Also, triphorids have

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been the subject of some recent studies in which several new species were described, e. g., DE JONG AND COOMANS (1988), MOOLENBEEK AND FABER (1989), FABER AND MOOLENBEEK (1991), and ROLÁN AND CRÚZ-ÁBREGO (1996), as well as the revisions of this family in Cuba where most of the Caribbean species were collected, as those of ROLÁN AND FERNÁNDEZ-GARCÉS (1993a, b, 1994, 1995) and ROLÁN AND ESPINOSA (1994).

During January 1997, a research trip to study the marine biodiversity of the Miskitos Archipelago was organized by the Universidad Autónoma de Madrid. Two non described species of triphorids with paucispiral protoconch were found in the samples of sediments collected during this expedition. Though only a few

empty shells of both species have been collected, they are described here as new species since both of them show clear differences with those previously known from the Western Atlantic, can be tentatively assigned to genera on the basis of conchological comparison with related species, and mean new information to this increasingly better known family in a poorly studied area of the Caribbean.

Abbreviations:

CER: E. Rolán collection (Museo Galego do Mar), Vigo.

DBUA: Departamento de Biología, Universidad Autónoma, Madrid.

MNCN: Museo Nacional de Ciencias Naturales, Madrid.

RESULTS

Family TRIPHORIDAE Gray, 1847 Subfamily TRIPHORINAE Gray, 1847 Genus *Marshallora* Bouchet, 1984

Marshallora nicaraguensis spec. nov. (Figs. 1-3)

Type material: Holotype (Fig. 1), MNCN n° 15.05/31723, shell of 2.9x1.0 mm, and two paratypes, from Cayo Muerto, Miskitos Archipelago (14° 34.1' N, 82° 43.2' W), from sediments collected at a depth of 6 m. One paratype from the same locality deposited in DBUA and one more and 1 fragment in CER; one paratype more to be deposited in a Nicaraguan institution.

Etymology: The specific name alludes to the country where the type material was collected.

Description: Shell (Figs. 1-2) up to 3.2 mm of length and 9 whorls, narrowly conical, spire near 4 times higher than aperture plus canal.

Colour of the shell including the apex uniformly dark brown. When the shell is under water or wet the cord below the suture appears a little darker; sometimes, the nodules of the subsutural row are somewhat lighter.

Protoconch (Fig. 3) of about 2-2 1/2 whorls, 370 µm of maximum diameter, and 275 µm of diameter of the first whorl. The nucleus is smooth, but in the following whorl begin two spiral cords, very prominent on all the protoconch whorls. Near the end of the protoconch appear one subsutural and one suprasutural small cords.

Teleoconch with up to 7 flat-sided or slightly convex whorls, reticulate sculpture with prominent, well-defined spiral cords and axial costae and nodular intersections; suture shallow, but well-defined. Two spiral cords at the beginning of the teleoconch; the upper one is wider than the other throughout all the teleoconch. Between the third and the fourth whorls of the teleoconch, a new smaller spiral cord appears in the space between the other two, and it increases its width slowly. In the body whorl, these three cords are of almost equal width, and there are another spiral cord in the periphery, and two more at the base, being the lower one not nodulous and close to the siphonal canal. Another very small spiral cord is present just in

the suture. No microsculpture is seen even with high magnification.

Base contracted. Aperture subquadrate. Outer lip sharp, thin and lighter in colour, with the spaces between the end of the cords of cream colour. Posterior anal notch very small or inappreciable. Inner lip thick. Anterior siphonal canal very short and open.

Animal and radula unknown.

Distribution: Only known from the type locality, Cayo Muerto, Miskitos Archipelago, Nicaragua.

Discussion: The inclusion of this species in the genus *Marshallora* is only tentative because not living specimens were collected and therefore, the radula and operculum could not be studied. Nevertheless, the shell features of *M. nicaraguensis* spec. nov. are very similar to those of other Caribbean species, *Marshallora nichupte* Rolán and Cruz-Ábrego, 1996, whose radula is known.

Marshallora nicaraguensis differs from other brown triphorid species by its paucispiral protoconch. *Marshallora nigrocincta* (C. B. Adams, 1839), *M. modesta* (C. B. Adams, 1850), *Cheirodonta verbernei* (Moolenbeek and Faber, 1983), *Isotriphora petersae* Moolenbeek and Faber, 1983, *Monophorus ateralbus* Rolán and Fernández-Garcés, 1994, *Cheirodonta decollata* Rolán and Fernández-Garcés, 1994, *Eutriphora sagei* Rolán and Fernández-Garcés, 1995, and *Triphora osclausum* Rolán and Fernández-Garcés, 1995, have a protoconch with more than three or four spiral whorls, all them with axial sculpture.

Among the Caribbean triphorids with paucispiral protoconch, *Triphora bartschi* Olsson, 1916, was described with 2-3 whorls of protoconch, smooth in the initial portion, with three strong spiral cords in the middle part and two on the final portion. This is a fossil species known from Yorktown and Duplin Miocene of Virginia and the Carolinas (OLSSON AND HARBISON, 1953). *Triphora calva* Faber and Moolenbeek, 1991, has a protoconch with only a spiral angulation between the end of the protoconch and the beginning of the teleoconch; it is known from Florida (original description) and Bahamas (Redfern, pers. comm.). *Cheirodonta apexcrassus* Rolán and Fernández-Garcés, 1994, has a distinctly vertical nucleus at the beginning of the protoconch and the two conspicuous spiral cords are nodulous; furthermore, the two spiral nodular cords of the first whorls of the teleoconch are equal in size, the siphonal canal is almost closed, and the anal sinus deep.

Marshallora nichupte Rolán and Cruz-Ábrego, 1996, is variable in colour, and shells with brown colour similar to those of *M. nicaraguensis* are frequent; nevertheless, the protoconch of *M. nichupte* has 1 $\frac{1}{2}$ -2 smooth whorls. A non-planktotrophic development can be inferred from the paucispiral protoconch of these two species. *M. nichupte* is only known from the Bojórquez-Nichupté lagoon complex (Yucatan, Mexico), far of the type locality of the present species. We guess that the two species share a common ancestor.

Cheirodonta miskitorum spec. nov. (Figs. 4-6)

Type material: Holotype (Fig. 4), MNCN n° 15.05/31724, of 3.1x1.3 mm, and four paratypes, from Arrecife The Witties (14° 10.6' N, 82° 43.2' W), Miskitos Archipelago, from sediments collected at a depth of 8 m. One paratype from the same locality deposited in DBUA, and two fragments in CER.

Etymology: The specific name alludes the Miskitos, the people living along the eastern coast of Nicaragua.

Description: Shell (Figs. 4-5) up to 3.4 mm of length, with about 8 whorls, ovoid.

Colour of the shell all white.

Protoconch (Fig. 6) of about 2-2 $\frac{1}{2}$ whorls, 360 μ m of maximum diameter, and 280 μ m of diameter of the first whorl. The nucleus and the beginning of

the first whorl are nodulous; in the first whorl appear two spiral cords not very prominent crossed by axial irregular and sometimes discontinuous riblets forming nodules. In the second whorl, the upper cord decreases in width until disappearing completely before its end, and the lower cord becomes more prominent, arriving alone at the end of the protoconch.

Teloconch with up to 6 flat-sided whorls, sculptured with prominent, well-defined spiral cords and axial costae, forming nodular intersections; suture shallow, but well-defined. Two spiral cords of equal width at the beginning of the teloconch. Between the fourth and the fifth whorls, a new spiral smaller cord appears in the space between the other two, close to the upper one; it increases its width slowly and finishes at the middle of the other two, but always is smaller than them. In the body whorl, there are three other cords below these three, being the lower one almost vertical and close to the siphonal canal. No microsculpture is seen even with high magnification.

Aperture rounded. Outer lip sharp, closing the anterior siphonal canal, which is short and curved. Anal notch deep.

Animal and radula unknown.

Distribution: Only known from the type locality, Arrecife The Witties, Miskitos Archipelago, Nicaragua.

Discussion: The generic assignation of this species to the genus *Cheirodonta* is

only based on the similarity of the shell with that of *Cheirodonta apexcrassus* Rolán and Fernández-Garcés, 1994.

Cheirodonta miskitorum spec. nov. differs from other Caribbean triphorids with white (or more or less whitish) colour, like *Cosmotriphora melanura* (C. B. Adams, 1850), *Triphora indigena* Dall, 1927, *Triphora meteora* Dall, 1927, *Triphora longissima* (Dall, 1881), *Triphora pyrrha* Henderson and Bartsch, 1914 and *Latriphora albida* (A. Adams, 1851), because the protoconchs of these species have more than two spiral whorls, and the teloconch of most of them have many spiral whorls, giving the shells an elongated form and rectilinear profile.

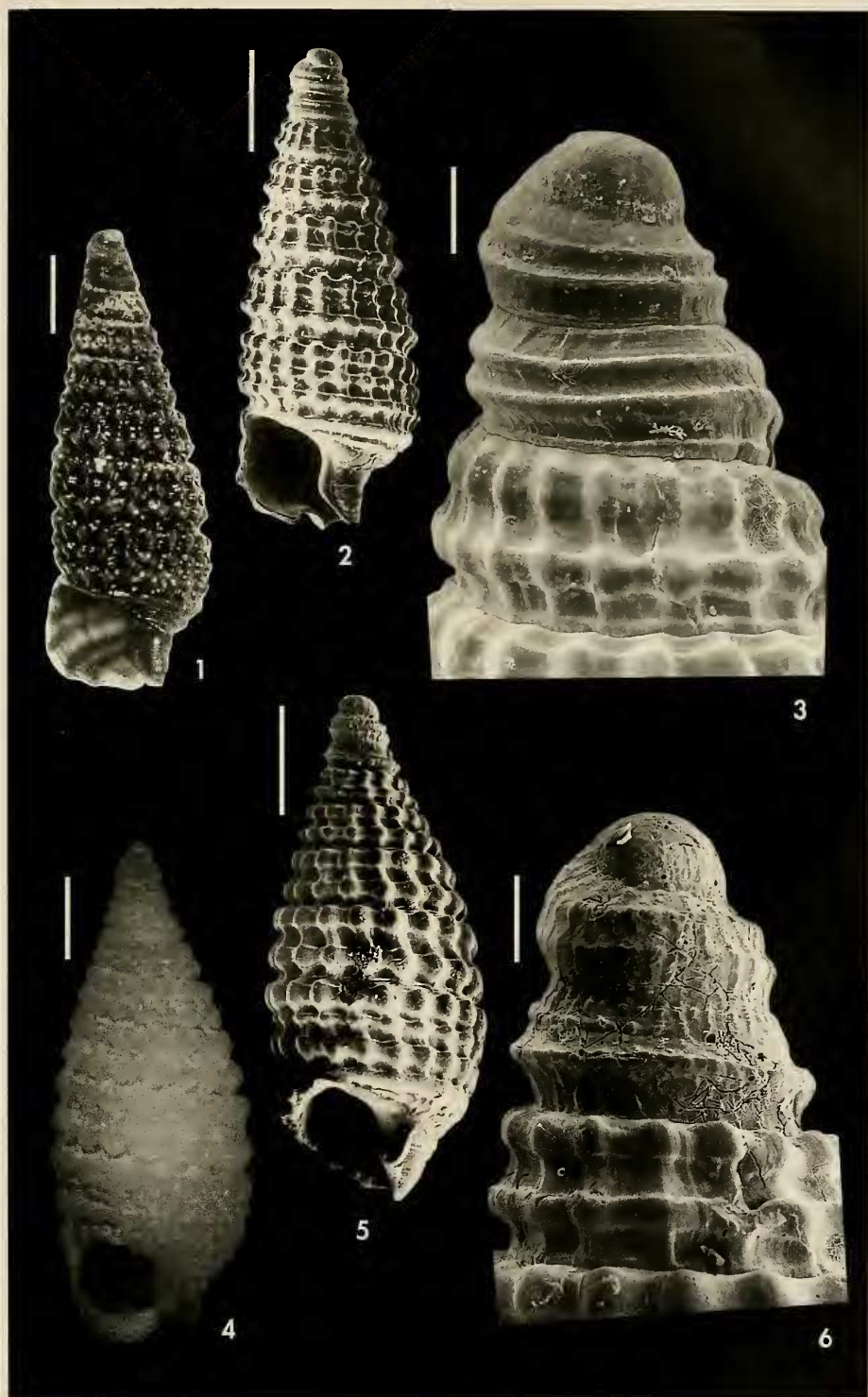
Two more species are whitish and have a paucispiral protoconch: *Iniforis carmelae* Rolán and Fernández-Garcés, 1993, and *I. immaculata* Rolán and Fernández-Garcés, 1993, both with an elongated shell, a separate anal hole and only two rows of tubercles. *Triphora pompona* Dall, 1927, also has a paucispiral protoconch, but a slender shape with about 21 whorls and it is more than 15 mm high.

Triphora bartschi Olsson, 1916, has an initially smooth protoconch of 2-3 whorls, with three strong spiral cords in the middle part and two at the end. This fossil species is known from Yorktown and Duplin Miocene of Virginia and the Carolinas (OLSSON AND HARBISON, 1953).

As mentioned above, *T. nichupte* Rolán and Cruz-Ábreo, 1996, from

(Right page) Figures 1-3. *Marshallora nicaraguensis* spec. nov., Cayo Muerto, Miskitos Archipelago (14° 34.1' N, 82° 43.2' W), Nicaragua. 1: Holotype (MNCN, 15.05/31723); 2: Paratype, immature specimen (MNCN, 15.05/31723); 3: Protoconch of paratype (MNCN, 15.05/31723). Figures 4-6. *Cheirodonta miskitorum* spec. nov., Arrecife The Witties (14° 10.6' N, 82° 43.2' W), Miskitos Archipelago, Nicaragua. 4: Holotype (MNCN, 15.05/31724); 5: Paratype (MNCN, 15.05/31724); 6: Protoconch of a paratype (MNCN, 15.05/31724). Scale bars, 1, 2, 4, 5: 0.5 mm; 3, 6: 0.1 mm.

(Página derecha) Figuras 1-3. *Marshallora nicaraguensis* spec. nov., Cayo Muerto, Archipiélago de los Miskitos (14° 34,1' N, 82° 43,2' O), Nicaragua. 1: Holotipo (MNCN, 15.05/31723); 2: Paratipo, ejemplar inmaduro (MNCN, 15.05/31723); 3: Protoconcha de un paratipo (MNCN, 15.05/31723). Figuras 4-6. *Cheirodonta miskitorum* spec. nov., Arrecife The Witties (14° 10,6' N, 82° 43,2' O), Archipiélago de los Miskitos, Nicaragua. 4: Holotipo (MNCN, 15.05/31724); 5: Paratipo (MNCN, 15.05/31724); 6: Protoconcha de un paratipo (MNCN, 15.05/31724). Escalas, 1, 2, 4, 5: 0,5 mm; 3, 6: 0,1 mm.



Yucatan (Mexico), is very variable in colour and it can be completely white, but its protoconch is smooth and its shell more elongated, with rectilinear profile, subquadrate aperture and open siphonal canal.

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Other species with paucispiral protoconch were mentioned in the discussion of the preceding species (*Triphora calva* and *Cheirodonta apexcrassus*) and differ by being brown and have a different protoconch.

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